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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/700,722	11/03/2003	Sunder Rathnavelu Raj	NLMLP041	6031

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EXAMINER	
PYO, MONICA M	

ART UNIT	PAPER NUMBER
2161	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/700,722	RAJ, SUNDER RATHNAVELU	
	Examiner	Art Unit	
	MONICA M. PYO	2161	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 January 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20-22,45,46 and 49-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *0-22,45,46 and 49-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 1/22/2009 has been entered.

2. Claims 20-22, 45-46, and 49-52 are currently pending in this application. In the Amendment filed 1/22/2009, claims 20, 22 and 45 are amended, and claims 50-52 are newly added. Claims 20-22, 45-46, and 49-52 are rejected.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Non Patent Literature "A versatile Data String-Search VLSI", published by IEEE on April 1988, written by Masaki Hirata et al. (hereinafter Hirata) in view of U.S. Patent No. 7,225,188 issued to Gai et al. (hereinafter Gai).

Regarding claim 20, Hirata discloses a method, comprising:

A). receiving a text string having a plurality of characters, as a search string with characters (Hirata: pg. 329, col. 1, lns. 4-20; pg. 329, col. 2, lns. 30-pg. 330, col. 1, lns. 19; fig. 2)**; and**

B). performing an unanchored search of a database of a stored patterns matching one or more characters of the text string using a state machine, wherein the state machine comprises a ternary content addressable memory (TCAM), wherein the performing further comprises, as the nonanchor mode search, the TCAM and character data stored in the CAM (Hirata: pg. 329, col. 2, lns. 1-12 & 18-29; pg. 330, col. 2, lns. 21-33; pg. 331, col. 2, lns. 6-25; pg. 332, col. 1, lns. 1-6; fig. 5):

C). converging all branches of the state machine (i.e., 512 word-length data can be stored as one string)**, for a given stored pattern** (i.e., stored reference data)**, to a single next state** (i.e., a single input data) **when a first number of the characters are matched to the contents of a state field of all state transitions of the branches** (i.e., eight outputs from eight pair-bit CAM cells) (Hirata: pg. 330, col. 1, lns. 1-col. 2, lns. 33; pg. 331, col. 1, lns.20- pg. 332, col. 2, lns. 5)**.**

Hirata does not explicitly discloses the feature of the method wherein the performing comprises comparing a state of the state machine and one of the plurality of characters with contents of a state field and a character field, respectively, stored in the TCAM, wherein the contents of the state field and the character field stored in the TCAM embody state transitions of the state machine, however, such a feature is well known in the art as disclosed in Gai (Gai: col. 10, lns. 9-37 & 63-col. 11, lns. 36; figs. 4, 6-7 - as the Deterministic Finite Automation [DFA] has a series of matching arcs and a match of the sequential characters) and it would have been

obvious to one of ordinary skill in the art at the time of invention was made to utilize such a feature in the data string-search VLSI system of Hirata in view of desire to enhance the data searching and matching system.

Regarding claim 21, Hirata and Gai disclose the method wherein the single next state is an earlier possible next state for at least one of the branches and wherein the converging comprises transitioning at least one of the branches to the earlier possible next state (Hirata: pg. 331, col. 1, lns. 20-col. 2, lns. 4).

5. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirata in view of Gai as applied to claims 20 and 21 above, further in view of U.S. Patent Application Publication No. US 2004/0133565 by Hinshaw et al. (hereinafter Hinshaw) and further in view of U.S. Patent No. 7,134,143 issued to Stellenberg et al. (hereinafter Stellenberg).

Regarding claim 22, Hirata and Gai do not explicitly disclose the method further comprising storing the characters in a first-in-first-out (FIFO) storage element having a plurality of positions, however, such a feature is well known in the art as disclosed in Hinshaw (Hinshaw: pg. 3, [0020-0023]) and it would have been obvious to one of ordinary skill in the art at the time of invention was made to utilize such a feature in the data string-search VLSI system of Hirata in view of desire to enhance the data searching and matching system. Hirata, Gai and Hinshaw do not explicitly disclose the features of the method positioning a read pointer at a first position; and adjusting the read pointer to a second position by an amount equal to N minus 1. However, such

features are well known in the art as disclosed Stellenberg: positioning a read pointer at a first position (Stellenberg: col. 6, lns. 18-46); and adjusting the read pointer to a second position by an amount equal to N minus 1 (Stellenberg: col. 6, lns. 18-46) and it would have been obvious to one of ordinary skill in the art at the time of invention was made to utilize such features in the data string-search VLSI system of Hirata in view of desire to enhance the data searching and matching system.

6. Claims 45-46 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirata, Gai and further in view of Hinshaw, and further in view of U.S. Patent No. 5,525,982 issued to Cheng et al. (hereinafter Cheng).

Regarding claim 45, Hirata and Gai disclose the method as disclosed in claim 20. Additionally, Hirata discloses the method wherein the control circuitry comprises a storage element for storing the plurality of characters (Hirata: pg. 330, col. 2, lns. 34-pg. 331, col. 1, lns. 10); a registered coupled to the storage element and the TCAM (Hirata: pg. 329, col. 2, lns. 30-pg. 330, col. 1, lns. 19; fig. 2). Hirata and Gai do not explicitly disclose the feature of a first-in-first-out (FIFO) storage element and a rollback circuit coupled to the FIFO storage element, however, such features are well known in the art as disclosed in Hinshaw: a first-in-first-out (FIFO) storage element (Hinshaw: pg. 3, [0020-0023]); a rollback circuit coupled to the FIFO storage element (Hinshaw: pg. 9, [0107]) and it would have been obvious to one of ordinary skill in the art at the time of invention was made to utilize such features in the data string-search VLSI system of Hirata in view of desire to enhance the data searching and matching system. Hirata,

Gai and Hinshaw do not explicitly disclose the feature of current prefix register, however, such feature is well known in the art as disclosed in Cheng (Cheng: col. 7, lns. 35-56; fig. 2A) and it would have been obvious to one of ordinary skill in the art at the time of invention was made to utilize such features in the data string-search VLSI system of Hirata in view of desire to enhance the data searching and matching system.

Regarding claim 46, Hirata and Gai and Hinshaw and Cheng disclose the apparatus further comprising a processor coupled to the pattern and state database (Hirata: pg. 329, col. 1, lns. 4-30).

Regarding claim 50, Hirata and Gai and Hinshaw and Cheng disclose the apparatus wherein the contents of the state field in the TCAM further comprise a previous result field (Hirata: pg. 331, col. 2, lns. 7- pg. 332, col. 1, lns. 21).

7. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirata, Gai, Hinshaw and in view of Cheng as applied to claims 45-46 and 50 above, and further in view of U.S. Patent No. 5,963,942 issued to Igata (hereinafter Igata).

Regarding claim 49, Hirata and Gai and Hinshaw and Cheng disclose the apparatus wherein the TCAM implements (Hirata: pg. 329, col. 1, lns. 1-20]). Hirata and Gai and Hinshaw and Cheng do not explicilty disclose the feature utilizing an Aho-Corasick algorith, however, such feature is well known in the art as disclosed in Igata (Igata: col. 4, lns. 41-65) and it would

have been obvious to one of ordinary skill in the art at the time of invention was made to utilize such features in the data string-search VLSI system of Hirata in view of desire to enhance the data searching and matching system.

8. Claim 51 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirata, Gai, Hinshaw and in view of Cheng as applied to claims 45-46 and 50 above, further in view of Igata, and further in view of U.S. Patent No. 7,305,422 issued to Wang (hereinafter Wang).

Regarding claim 51, Hirata and Gai and Hinshaw and Cheng do not explicitly disclose the apparatus wherein the FIFO comprises a read pointer tht can be selectively pushed back a number of the characters by the rollback circuit, however, such feature is well known in the art as disclosed in Wang (Wang: col. 6, lns. 56-65) and it would have been obvious to one of ordinary skill in the art at the time of invention was made to utilize such features in the data string-search VLSI system of Hirata in view of desire to enhance the data searching and matching system.

9. Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirata in view of Gai as applied to claims 20 and 21 above, further in view of Hinshaw and Stellenberg, and further in view of Wang.

Regarding claims 52, Hirata and Gai and Hinshaw and Stellenberg disclose the apparatus further comprising the feature to read pointer a number of positions in response to a rollback

field (Stellenberg: col. 6, lns. 18-46). Hirata and Gai and Hinshaw and Stellenberg do not explicitly disclose the term rolling back, however, such feature is so well known in the art as disclosed in Wang (Wang: col. 6, lns. 56-65) and it would have been obvious to one of ordinary skill in the art at the time of invention was made to utilize such features in the data string-search VLSI system of Hirata in view of desire to enhance the data searching and matching system.

Response to Arguments

10. Applicant's arguments with respect to claims 20-22, 45-46, and 49-52 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MONICA M. PYO whose telephone number is (571)272-8192. The examiner can normally be reached on Tu & Thur 7:00 - 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Apu Mofiz can be reached on 571-272-4080. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Monica M Pyo
Examiner
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/mp/
03/2009

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